

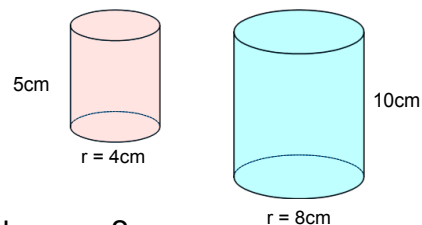
## 12.7 Explore Similar Solids

Similar solids--same shape, but not necessarily the same size

All spheres are similar.

For other solids:

Bases must be similar and other corresponding lengths must be proportional.



ex 1:

Are the bases ~?

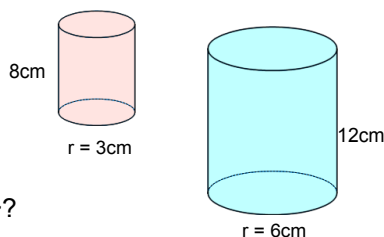
yes

Scale factor?

1:2

Are other lengths proportional?

yes



ex 2:

Are the bases ~?

yes

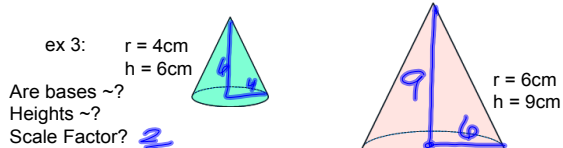
Scale factor?

1:2

Are other lengths proportional?

$\frac{8}{2} \neq \frac{1}{2}$

Not ~



Are bases ~?

Heights ~?

Scale Factor?

$\frac{3}{2}$

Find the following for each figure and compare the ratios to scale factor.

	small		large	
L	$2\sqrt{13}$	2:3	$3\sqrt{13}$	
C	$8\pi$	2:3	$12\pi$	
B	$16\pi$	4:9	$36\pi$	$\frac{16}{36} = \frac{4}{9}$
LA	$8\pi\sqrt{13}$	4:9	$18\pi\sqrt{13}$	$\frac{8}{18} = \frac{4}{9}$
SA				
V	$32\pi$	8:27	$108\pi$	$\frac{32}{108} = \frac{8}{27}$

Theorem 12.13--If the scale factor of 2 ~ solids is  $a:b$ , then:

1. The ratio of corresponding areas is  $a^2:b^2$
2. The ratio of corresponding volumes is  $a^3:b^3$

$$\begin{array}{l} SF \quad a:b \\ RA \quad a^2:b^2 \\ RV \quad a^3:b^3 \end{array}$$

Ex:

Two solid metal cylinders are similar.  
radius of 1st = 10cm  
radius of 2nd = 14cm

What is the scale factor?  $5:7$

If the smaller cylinder weighs 2.5 kg, how much does the larger one weigh?

$$\frac{125}{343} = \frac{2.5}{V}$$

$6.86 \text{ kg}$

Ex:

Two similar prisms have  $LA = 27\text{cm}^2$  and  $LA = 75\text{cm}^2$ .

What is the scale factor?

If the volume of the smaller is  $V = 121.5\text{cm}^3$ , what is the volume for the larger?

Ex:

The scale factor of 2 cones is 5:6.

What is the ratio of:

$$\begin{array}{l} p \quad 5:6 \\ LA \quad 25:36 \\ SA \quad 25:36 \\ V \quad 125:216 \\ l \quad 5:6 \\ r \quad 5:6 \end{array}$$

If the LA of smaller is  $100\pi$ , what is LA for the larger?

$$\frac{25}{36} = \frac{100\pi}{LA}$$

$144\pi = LA$

If the V of smaller is  $86.4\pi$ , what is V for the larger?

$$\frac{125}{216} = \frac{86.4\pi}{V}$$

$149.3\pi = V$

Ex:

Two similar pyramids have  $LA = 12\text{cm}^2$  and  $LA = 27\text{cm}^2$ .

$$\frac{12}{27} = \frac{4}{9} = RA$$

What is the scale factor?

$$\frac{2}{3}$$

If the volume of the smaller is  $V = 20\text{cm}^3$ , what is the volume for the larger?

$$\left(\frac{2}{3}\right)^3 \quad \frac{8}{27} = \frac{20}{V}$$

$67.5\text{cm}^3$

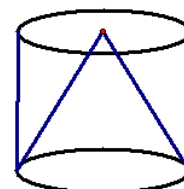
Is this cylinder ~ to the cone?

NO

Cylinder Volume =  $36\pi \text{ u}^3$

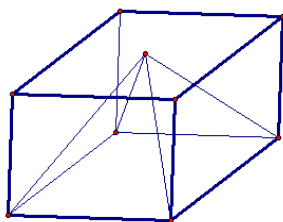
Cone Volume = ?  $12\pi \text{ u}^3$

$$\begin{array}{l} V = Bh \\ V = \frac{1}{3}Bh \end{array}$$



Pyramid Volume =  $9 \text{ u}^3$   
Prism Volume = ?

$\times 3$   
 $27 \text{ u}^3$



HW

p850-851

3-6, 8, 9, 11-15, 19